EARPIECE

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates to earpieces and, more particularly, to an earpiece effectively prohibits water from passing through but allows a certain volume of sound waves to pass.

2. Description of the Related Art:

A conventional earpiece **6**, as shown in FIG. 12, is a solid, cylindrical cork. When in use, the earpiece **6** is plugged into the external auditory canal **71** of the ear **7** to isolate outside noises. After installation of the earpiece **6** in the ear **7**, the user cannot hear the broadcasting or calling from another person during an emergency. Further, an user may use the earpiece **6** to seal the ear against water when swimming. Because the user who worn the earpiece in each ear cannot hear the warning broadcasting or calling from another person during a dangerous situation, a tragic accident may happen. In addition to the aforesaid problem, the installation of the earpiece **6** in the ear may cause the user to lose the balance and to suffer headache.

SUMMARY OF THE INVENTION

The present invention has been accomplished under the

circumstances in view. It is the main object of the present invention to provide an earpiece, which eliminates the aforesaid problems. According to one embodiment of the present invention, the n earpiece has a hollow cylindrical earpiece body and a diaphragm suspended at one end of the hollow cylindrical earpiece body for protecting the ear against outside water and for enabling the ear to hear a certain volume of sound. According to an alternate form of the present invention, the earpiece comprises a hollow cylindrical earpiece body and an end cap fastened to one end of the hollow cylindrical earpiece body. The end cap has a thin layer of base that protects the ear against outside water and allows the ear to hear a certain volume of sound when the user is swimming.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional elevation of an earpiece constructed according to a first embodiment of the present invention.

FIG. 2 is a plain view of the earpiece according to the first embodiment of the present invention.

FIG. 3 is similar to FIG. 2 but showing the diaphragm made relatively thicker.

FIG. 3A is similar to FIG. 2 but showing the uniform wall thickness of the diaphragm and the peripheral wall of the

hollow cylindrical earpiece body.

FIG. 4 is sectional elevation of an alternate form of the earpiece constructed according to the first embodiment of the present invention.

FIG. 5 is an exploded view in section of an earpiece constructed according to a second embodiment of the present invention.

FIG. 6 is an exploded view in section of an earpiece constructed according to a third embodiment of the present invention.

FIG. 7 is a sectional view of an earpiece constructed according to a fourth embodiment of the present invention.

FIG. 8 is an elevational view of an earpiece constructed according to a fifth embodiment of the present invention.

FIG. 9 is a sectional view of the earpiece according to the fifth embodiment of the present invention.

FIG. 10 is an elevational view of an earpiece constructed according to a sixth embodiment of the present invention.

FIG. 11 is a sectional view of the earpiece according to the sixth embodiment of the present invention.

FIG. 12 illustrates the application of an earpiece according to the prior art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. from 1 through 4, an earpiece **1** is shown comprising a hollow cylindrical body **11** shaped line a truncated cone and defining a chamber **12**, and a diaphragm **13** suspended at one end of the chamber **12**. The diaphragm **13** prohibits water from passing through the chamber **12** to the inside of the user's ear but allowing the ear to hear certain volume of sound. Therefore, the user bearing the earpiece **1** can still hear the output sound of a broadcasting unit. The thickness of the diaphragm **13** may be determined subject to actual requirement (see FIGS. 2 and 3). FIG. 3A shows that the diaphragm **13** and the peripheral wall of the body **11** have same wall thickness. Further, the diaphragm **13** may be provided at one end, namely, the big end of the hollow cylindrical body **11** (see FIGS. from 1 through 3), or the other end, namely, the small end of the hollow cylindrical body **11** (see FIG. 4).

FIG. 5 shows an ear piece constructed according to a second embodiment of the present invention. According to this embodiment, the earpiece **2** comprises a hollow cylindrical body **21**, and an end cap **23** fastened to one end of the body **21**. The body **21** has an outside annular coupling groove **211** around the periphery thereof at one end, and an open chamber **22** axially

extended through the two distal ends thereof. The end cap **23** comprises a thin layer of base **231** and an annular coupling flange **232** extended from the inside wall of the cap body thereof for coupling to the coupling groove **211** of the body **21**. After connection of the coupling flange **232** to the coupling groove **211**, the end cap **23** and the body **21** are positively secured together in a flush manner. Further, the thickness of the thin layer of base **231** of the end cap **23** is determined subject to actual requirement.

FIG. 6 shows an ear piece constructed according to a third embodiment of the present invention. According to this embodiment, the earpiece **3** comprises a hollow cylindrical body **31**, and an end cap **33** fastened to one end of the body **31**. The body **31** comprises an inside annular coupling groove **321** around the inside wall thereof near one end and an open chamber **32** axially extended through the two distal ends thereof. The end cap **33** comprises a thin layer of base **331** and an outside annular coupling flange **332** extended around the periphery of the cap body thereof for coupling to the inside annular coupling groove **321**. After insertion of the end cap **33** into one end of the body **3**, the outside annular coupling flange **332** is forced into engagement with the inside annular coupling groove **321**, and

the thin layer of base **331** is stopped at one end of the body **3**.

FIGS. 7 shows an earpiece constructed according to a fourth embodiment of the present invention. According to this embodiment, the earpiece **4** comprises a hollow cylindrical body **41** an open chamber **42**. The hollow cylindrical body **41** has one end opened, the other end closed, and an outside annular groove **411** disposed around the periphery thereof near the close end, and a thin wall portion **412** surrounded by the outside annular groove **411**. The thin wall portion **412** enables certain volume of sound waves to pass.

FIGS. 8 and 9 show an earpiece constructed according to a fifth embodiment of the present invention. According to this embodiment, the earpiece **4** comprises a tapered, cylindrical body **41**, a plurality of axial holes **421** axially extended to one end, and a diaphragm **43** disposed at the other end. The diaphragm **43** prohibits water and high noises from passing through the axial holes **421** to the inside of the ear in which the earpiece **4** is installed, but allowing a certain amount of sound waves to pass.

FIGS. 10 and 11 show an earpiece constructed according to a six embodiment of the present invention. According to this embodiment, the earpiece **5** comprises a hollow cylindrical body

51, two diaphragms 53 respectively disposed at the ends of the hollow cylindrical body 51, an enclosed chamber 52 defined in the hollow body 51 between the diaphragms 53, and flexible conical skirts 54 extended around the periphery of the hollow cylindrical body 51 and axially spaced from one another. The flexible conical skirts 54 have different diameters arranged in proper order.

Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.